State of New Mexico
LEGISLATIVE EDUCATION STUDY COMMITTEE

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June 7, 2006

MEMORANDUM

TO: Legislative Education Study Committee

FR: Frances R. Maestas

RE: STAFF BRIEF: MATH AND SCIENCE EDUCATION INITIATIVE: NEW MEXICO PARTNERSHIP FOR MATH AND SCIENCE/ IMPLEMENTATION OF THE MATH AND SCIENCE BUREAU

The 2006 Interim Workplan of the Legislative Education Study Committee (LESC) includes several components of the math and science initiative. Two of them are: (1) a report from the New Mexico Partnership on Mathematics and Science Education on the implementation of the recommendations on the New Mexico First Town Hall on Mathematics and Science Education; and (2) a report from the Public Education Department (PED) on the implementation of the new math and science bureau at PED, one of the Town Hall's recommendations.

Issues:

Student Proficiency on Math and Science

- The 2005 state-by-state scores from the National Assessment of Educational Progress (NAEP), reported in *The Nation's Report Card*, indicate the following information regarding New Mexico's status in mathematics achievement:

  - overall math scores for grade 8 are higher than only three of the 52 jurisdictions tested (the 50 states, the District of Columbia, and the Department of Defense Education Activity schools) and lower than 47 jurisdictions;
  - the average grade 8 math score was 24 points lower for Hispanic students (26 points lower for Native American students) than for white students; and
  - students eligible for a free/reduced-fee lunch program had an average grade 8 math score that was 24 points lower than students who were not eligible.

- In science, New Mexico students in grades 4 and 8 demonstrated little or no improvement between 2000 and 2005 on the NAEP science test and posted scores that were among the lowest in the nation for students considered proficient in the subject as noted in the following data:

  - in grade 4, approximately 18 percent of the state's students performed at or above proficiency on the 2005 NAEP test, not significantly different from the 17 percent in 2000 and lower than the 27 percent proficiency rate of fourth graders in the nation as a whole in 2005;
  - for students in grade 8, some 18 percent tested proficient or better in 2005, lower than the 20 percent in 2000 and the 27 percent proficiency rate of the nation's eighth graders in 2005;
  - overall, New Mexico performed lower than 37 jurisdictions, and along with Alabama, Arizona, California, Hawaii, Louisiana, Nevada, and Mississippi had the lowest percentages of children performing at a proficient level; and
  - according to PED, the average scores in science of all ethnic groups in New Mexico were also not significantly different between 2000 and 2005; however, Anglo students did better than black, Hispanic, or Native American students.

- According to the 2005 New Mexico Standards Based Assessment, the lowest proficiency rates for both math and science are in grades 6, 7, and 8.

Efforts to Increase Student Proficiency in Math and Science

- During the 2005 interim, the LESC heard a presentation on the Mathematics and Science Education Town Hall that was convened in mid-November 2005 by New Mexico First on behalf of the New Mexico Partnership on Mathematics and Science Education to examine ways to improve mathematics and science education in New Mexico. The central concern was that, given the current state of participation in mathematics and science education and the low proficiency levels of New Mexico students, the state will be required to import more of these skills and to export more of the work requiring these skills, thus excluding many New Mexico citizens from the opportunities and rewards of science and mathematics education.

- The Town Hall reached consensus on eight recommendations (see Attachment) to address the state's needs related to science and mathematics education. Among them were a statewide initiative, led by the Governor and other policymakers, to make mathematics and science education a top priority for all schools; the creation of a mathematics and science division in PED; the creation of an educational model that school districts can use to align curriculum, teacher professional development, and funding; and an ongoing public awareness campaign to raise public interest in and enthusiasm for science and mathematics. According to the partnership, the recommendation to create a unit to administer math and science education at PED would help implement most of the other Town Hall recommendations.

- In 2006, the Legislature considered legislation to enact the *Mathematics and Science Education Act*; however the bill did not pass. Among its provisions, the act would have created the Mathematics and Science Bureau in the Instructional Support and Vocational Education Division of PED; required PED to design and implement a statewide mathematics and science initiative to improve mathematics and science proficiency in the state; allowed

PED to work with national laboratories and other facilities to create internships for high school students and with institutions of higher education to increase the rigor of mathematics and science courses in teacher preparation programs; provided mathematics and science summer institutes for public school teachers; and supported a statewide outdoor classroom program that provides hands-on scientific experiences to improve student achievement. (During the 2005 interim, the committee heard a report from PED and the State Parks Division of the Energy, Minerals & Natural Resources Department requesting an appropriation of $250,000 to pilot an outdoor classroom initiative in New Mexico's 33 state parks.)

- For FY 07, the Legislature appropriated $250,000 to PED to establish a math and science bureau at the department. The *General Appropriation Act of 2006* also includes two math and science appropriations to PED: $699,300 in recurring dollars to fund Summer Reading, Math and Science Institutes and $1.0 million in nonrecurring dollars to fund Summer Institutes for Reading and Math.

- On May 1, 2006, PED submitted the department's FY 07 Operating Budget to the Department of Finance and Administration and requested that, of the $250,000 appropriation to fund a math and science bureau, $230,800 be budgeted for personal services and employee benefits and the remaining $19,200 be budgeted for other expenditures.

Background:

New Mexico Partnership for Mathematics and Science Education
Affiliated with the National Association of State Science and Mathematics Coalitions, the New Mexico Partnership for Math and Science Education is a nonprofit organization comprising individuals and institutions that are committed to improving the quality and quantity of education in science, mathematics, and engineering in the state of New Mexico.

The mission of the organization includes:

- advancing, encouraging, and improving the teaching of mathematics and sciences across the state of New Mexico;

- working with PED and the Higher Education Department in developing state goals for math and science education; and

- establishing a statewide information and exchange network that promotes communication and cohesiveness among the state's math and science educators.

New Mexico First
- According to New Mexico First, "the Town Hall model is a very specific consensus building process developed by Arizona Town Halls and modified by New Mexico First. Participants meet for two days in small groups, each led by a discussion leader and recorder trained by New Mexico First. As reports from the groups' deliberations are collected during this period, they are synthesized by the master recorder" into a draft Consensus Report. At a final plenary session, Town Hall participants discuss, debate, and amend the draft document until consensus is reached. The Consensus Final Report is provided to the client, who determines how implementation will occur.

Presenters:

For this presentation, Ms. Barbara Kimbell, Interim Co-president, and Dr. Patrick "Rick" Scott, Co-president Emeritus, New Mexico Partnership on Mathematics and Science Education, will discuss the implementation of the Town Hall's recommendations; Mr. Larry Langley, President and CEO of the New Mexico Business Roundtable for Educational Excellence, will discuss math and science education from a business perspective; and Dr. Catherine Cross Maple, Deputy Secretary, Learning and Accountability, PED, will outline the status of the new bureau and the status of math and science education in New Mexico.

Questions the committee may wish to consider:

1. What do the data tell about the state of math and science education in New Mexico?

2. What are the signs that the public values or does not value math and science literacy?

3. What are specific ways that educators can promote the importance of math and science literacy?

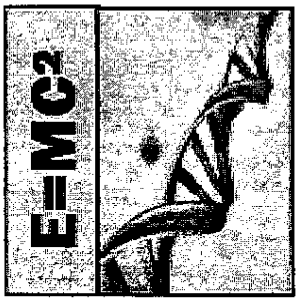
4. What do best practices tell about successful math and science programs in other states and/or other countries?

5. What models or systems of teacher preparation and professional development can ensure that future teachers have the pedagogical content knowledge they need in order to facilitate high student achievement in math and science?

6. What other strategies, other than teacher preparation and professional development, are needed to achieve math and science literacy?

ATTACHMENT

What can *we* do to improve mathematics and science education in New Mexico?



NEW MEXICO PARTNERSHIP FOR
MATHEMATICS & SCIENCE EDUCATION
TOWN HALL
Convened by New Mexico First

On behalf of:
The New Mexico Partnership for
Mathematics & Science Education
NM EPSCOR
ITP
NASA
NASSMC

November 17, 18, & 19, 2005
Glorieta Conference Center
Glorieta, New Mexico

Recommendations: Looking Forward

Relevancy of mathematics and science education, in terms of the content and how concepts are taught, was a key theme throughout the discussions. Panelists also focused on ways to address the concerns expressed earlier.

Everyone involved agreed that strong leadership is necessary to adopt these recommendations. Those impacted by these issues must join with the implementation team to work with the Governor, the Legislature, the Public Education Department, higher education institutions, and school districts to move forward a statewide effort to improve the achievement of our students in mathematics and science. After discussing those factors that contributed to the lack of student achievement, participants came up with the following consensus recommendations:

1. Create a New Mexico mathematics and science initiative that establishes consistency between how teachers are educated, what they teach, the standards that govern what is taught, student learning, and assessment.

2. Establish a statewide mathematics and science initiative to improve mathematics and science instruction and narrow the achievement gap. This initiative will be based on leadership from those who can best assist with the success of the effort, including: the Office of the Governor, the Secretary of Education, the Secretary of Economic Development, the Secretary of Higher Education, and the Legislature. The initiative also will be supported by an advisory council, with members that are representative of the education community and all stakeholders. Permanent staff will be assigned to provide additional leadership and implementation. The initiative will be further supported by a statewide strategic plan for mathematics and science education crafted by the advisory council with input from key decision makers and stakeholders. The strategic planning process will include budget projections. The Advisory Council will advise the legislature annually as to the budget. Representatives from the Public Education Department, Higher Education Department, Pre K-12 teachers and students, post-secondary institutions, research labs, and other relevant stakeholders will be involved in developing and sustaining an ongoing collaborative partnership and process to develop and implement an action plan for the state to address mathematics and science literacy. This body will utilize statewide and national data, best practices and exemplary models, and student input to foster student and educator learning and achievement.

3. Create a unit at the Public Education Department for science and mathematics with sufficient staff to cover the state. This is unit will report to a high level, (e.g. a cabinet level) position. This unit will inject expertise into the system at every level from the building level to the state department level, and will build and support infrastructure. It will also work to staff schools with appropriate mathematics and science experts in content and pedagogy.

4. Create a New Mexico Mathematics and Science educational model that allows districts to align mathematics and science curriculum, provides teacher professional development and school based support, provides leadership development (for principals and district leaders), aligns district funds, partners with Higher Education and Local Education Agencies, and aligns licensure programs. The curriculum and the process will be flexible and fluid and allow for different entry points based on district needs. The state will provide technical and financial assistance to districts willing to adopt this model.

5. Colleges and universities will increase the rigor of mathematics and science requirements for teachers entering teacher education programs and licensure by increasing the number of credit hour requirements and/or the quality of mathematics and science courses, and recruitment of teachers.

6. Increase opportunities for both teachers and students to translate knowledge from the standard classroom experience to practical, timely and relevant applications. Examples of strategies in this area include: internships, expanded lab and fieldwork opportunities, exposure to professionals in the area of science and mathematics, and student-identified research projects and family activities (such as camping trips, museum activities, field trips and/or summer camps).

7. Develop and implement a structure for comprehensive longitudinal on-going professional development for teachers to develop and refine the pedagogical and content knowledge they need to effectively teach mathematics and science to all students. Provide teachers with the funding and time they need to participate. Adopt the National Staff Development Council standards. Protect dedicated time within the school day for professional development in mathematics and science.

8. Create ongoing public awareness programs to raise public interest and enthusiasm for science and mathematics. Provide support for new and existing outreach programs. Include a marketing and media campaign such as has never been seen in New Mexico. Identify the strong leaders that can be advocates at the legislature.